

REMARKS

Claims 1-16 are pending in this application. By this Amendment, the specification and claims 1, 8, 15 and 16 are amended. No new matter is added.

The Office Action objects to claims 1, 8, 15 and 16 because of informalities. Applicants amend claims 1 and 8 to insert the word "electrically" before "conductive" as suggested by the Examiner to obviate the objection thereto. The Office Action asserts that the limitations within the parenthetical text of claims 15 and 16 are confusing. Claims 15 and 16 are amended to clarify the claim language. The Office Action asserts that the claimed formula recited in claims 15 and 16 is different from the formula described in the specification. The formula described in paragraph [0020] of the specification is amended to reflect the claimed formula in claims 15 and 16. Accordingly, withdrawal of the objection to claims 1, 8, 15 and 16 is respectfully requested.

Applicants amend paragraph [0003] to indicate that although the phrase "diffusion" coefficient is used through out the specification, the methods and apparatus disclosed therein relate to the determination of an "inter-diffusion coefficient." Applicants respectfully submit that to one of ordinary skill in the art, the term "diffusion coefficient," as used in the context of the specification and recited in claims 1-16, would properly be considered to be an "inter-diffusion" coefficient. Therefore, no new matter is introduced by this Amendment.

The Office Action rejects claims 1-12 and 14-16 under 35 U.S.C. §103(a) over SU 1346977/SU3984301A ("SU") in view of U.S. Patent No. 5,038,996 to Wilcox et al. ("Wilcox"). This rejection is respectfully traversed.

Independent claim 1 recites, *inter alia*, a method for measuring diffusion coefficient in electrically conductive melts, comprising the steps of joining together two conductive solid materials in parallel with a gravity direction and by heating and melting the materials under static magnetic field orthogonal to the gravity direction to form two conductive melts.

Independent claim 8 is an apparatus claim for measuring an inter-diffusion coefficient in conductive melts, comprising a heater for heating and melting two conductive solid materials joined along a gravity direction and a magnetic field-applying means for applying a static magnetic field to the conductive melts in a direction orthogonal to the direction of gravity.

SU discloses a method comprising joining an impurity material to a thin film of a solid silver material by being placed in a thermostat and being subjected to heating and the application of a constant magnetic field perpendicular to the surface. The Office Action acknowledges that SU fails to disclose that heating is done to melt the materials and further fails to disclose that the magnetic field is applied perpendicular to the gravity direction (horizontally). The Office Action asserts that Wilcox make up for the deficiencies of SU. Applicants respectfully submit that independent claims 1 and 8 are patentable not only due to the failure of SU in view of Wilcox to disclose, teach or suggest all recited features of the claims, but are also patentable based upon the improper combination of SU and Wilcox.

SU only discloses the determination of a coefficient of diffusion of impurities in thin metal films, that is, the impurity diffusion coefficient of the impurities into the metal film. SU does not measure a diffusion coefficient between the electrically conductive solid materials, that is, the diffusion coefficient of the first electrically conductive material in the second material, and the diffusion coefficient of the second electrically conductive material into the first material. In other words, Applicants recite the inter-diffusion coefficient between the two conductive melts. SU fails to disclose, teach or suggest implicitly or explicitly, a method or apparatus to determine an inter-diffusion coefficient, as recited in claims 1 and 8.

The Office Action asserts that Wilcox discloses a method wherein materials are melted and inter-diffusion is created. The Office Action further asserts that it would be

obvious to apply the apparatus of Wilcox to the method of SU to suggest the recited features of claims 1 and 8. Applicants respectfully disagree.

Applicants respectfully submit that neither SU nor Wilcox suggest the desirability of combining such teachings. The Office Action appears to use improper hindsight reconstruction to pick and choose among isolated disclosures. It is improper to use the claimed invention as an instruction manual to piece together the teachings of the prior art so that the claimed invention is rendered obvious. As disclosed in the abstract, Wilcox only discloses a bonding method between metallic surfaces between metallic surfaces in which both surfaces are coated with a layer of two materials, abutted together and the layers then heated to form a localized liquid, which upon solidification results in an interconnection between the surfaces. Nowhere does Wilcox disclose, teach or suggest measuring a coefficient in conductive melts, let alone an inter-diffusion coefficient, as recited in claims 1 and 8.

Notwithstanding the improper combination of SU and Wilcox, Applicants submit that SU and Wilcox do not disclose, teach or suggest all recited features of claims 1 and 8. Specifically, although the Office Action acknowledges that SU fails to disclose applying a magnetic field orthogonal to the gravity direction, the Office Action does not indicate where Wilcox discloses, teaches or suggests this feature.

Moreover, not only does SU fail to disclose the application of a magnetic field orthogonal to a gravity direction, as recited in claims 1 and 8, SU explicitly discloses the magnetic field being perpendicular to the surface of the metal film, and thus, the applying direction of the magnetic film becomes parallel to the gravity direction because the impurities are applied to the surface of the metal film. Applicants respectfully submit that SU discloses that the applying direction of the magnetic field can only be parallel to the gravity direction,

for if not, the impurities cannot be applied to the surface of the metal film because the impurities would be applied to the surface against gravity.

Accordingly, Applicants respectfully submit that independent claims 1 and 8 are patentable over SU and Wilcox. Claims 2-7 and 9-16 depend from independent claims 1 and 8, respectively, and are likewise patentable over the applied references at least in view of their dependency, as well as for the additional features they recite. Accordingly, withdrawal of this rejection is respectfully requested.

The Office Action further rejects claim 13 under 35 U.S.C. §103(a) over SU in view of Wilcox and further in view of U.S. Patent No. 5,304,972 to Sato. This rejection is respectfully traversed.

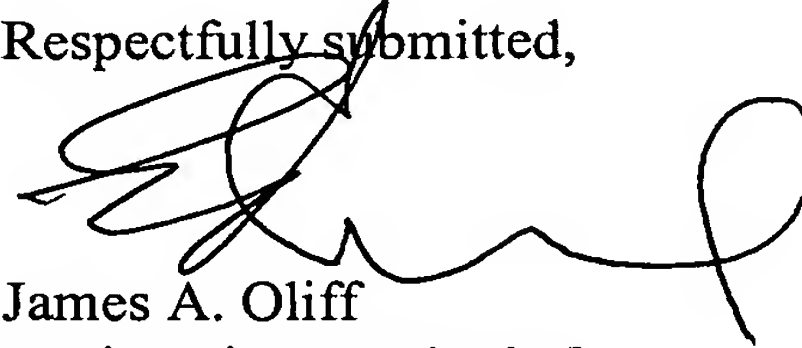
Applicants respectfully submit that, as discussed above, independent claim 8 is patentable over SU in view of Wilcox. The super conducting magnet apparatus of Sato likewise fails to disclose magnetic field-applying means for applying static magnetic field to conductive melts in a direction orthogonal to the gravity direction, as recited in claim 8.

Therefore, Applicants respectfully submit that the combination of SU, Wilcox and Sato fails to disclose, teach or suggest all the features recited in claim 8. Accordingly, claim 8 is patentable over SU, Wilcox and Sato, and claim 13 is likewise patentable over the applied references at least in view of its dependence on claim 8, as well as for the additional features it recites. Withdrawal of the rejection is respectfully requested.

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-16 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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